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Tunnel magnetoresistance and spin transfer torque in magnetic tunnel junction with embedded nanoparticles

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Abstract

© 2018 The Authors, published by EDP Sciences. The theoretical model of spin-dependent transport in magnetic tunnel junctions (MTJ) containing magnetic or non-magnetic nanoparticle is developed. The dependences of tunnel magnetoresistance (TMR) and in-plane component of spin transfer torque (STT) on the applied voltage for various sizes of nanoparticles of the order of the mean free path of the conduction electron are calculated. The calculation is performed in the approximation of the ballistic transport of conduction electrons through the insulating layers of the MTJ and the nanoparticles.

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